RESPONSE FRAMEWORK FOR MAJOR EMERGENCIES AT WATER AND SEWAGE WORKS IN ONTARIO

SEPTEMBER 1990

Ontario
Environment
Environnement
Jim Bradley, Minister/ministre

ISBN 0-7729-6667-2

RESPONSE FRAMEWORK FOR MAJOR EMERGENCIES AT WATER AND SEWAGE WORKS IN ONTARIO

Report prepared for:
Water Resources Branch
Environmental Services
Ontario Ministry of the Environment

Report prepared by:
Proctor and Redfern Limited

SEPTEMBER 1990

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PIBS 1246
log 90-2307-019

92-04298/

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STATEMENT

The Ontario Ministry of the Environment Response Framework for Major Emergencies at Water and Sewage Works is designed to provide assistance beyond the resources of a local municipality in the event of a major disaster. The Response Framework is not intended to deal with an emergency of a nuclear origin, nor a man-made emergency due to war, sabotage or terrorist activities, strikes or riots.

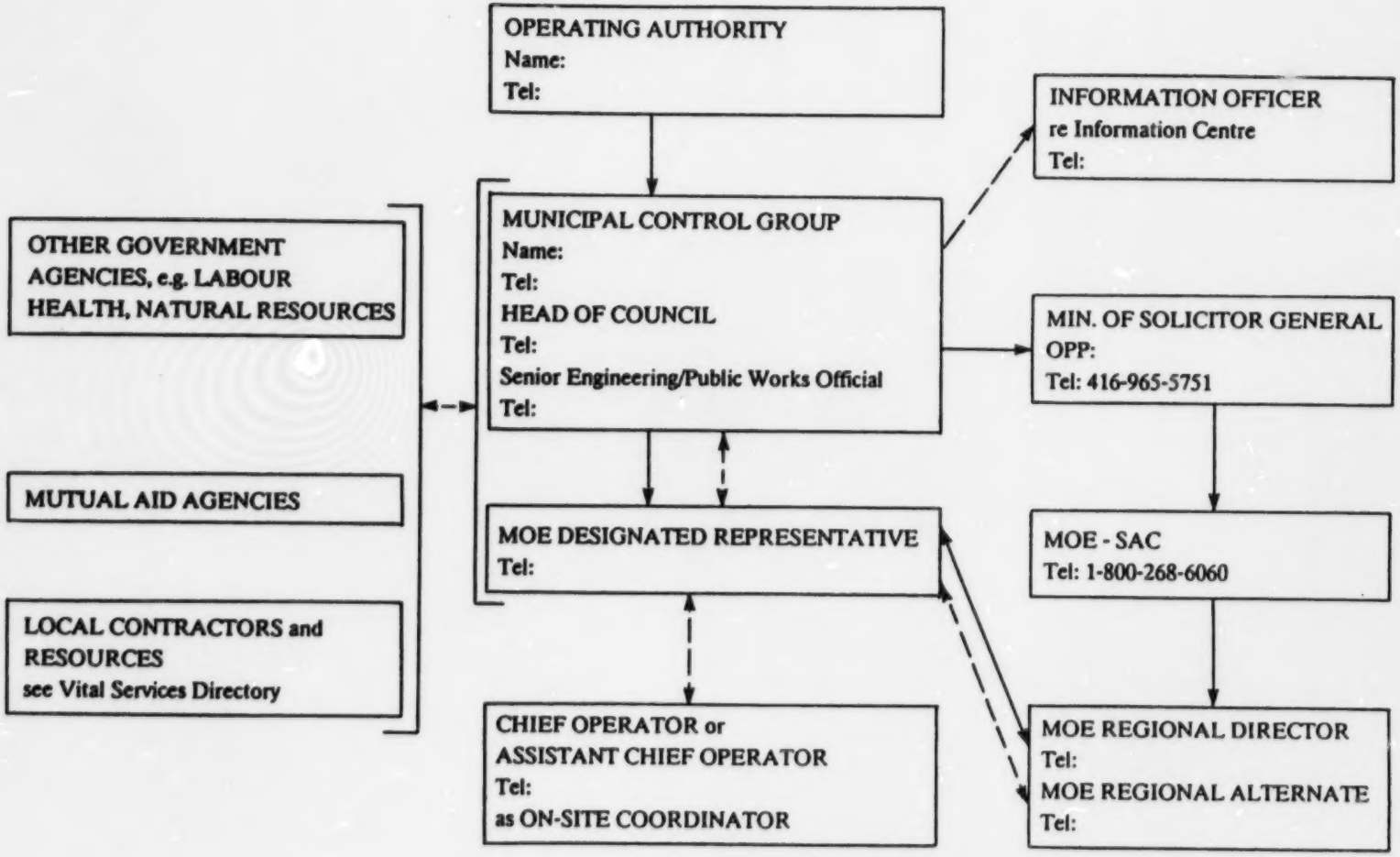
The procedures of this Response Framework will function through the existing municipal emergency response plan and its specific organizational structure. Thus access is provided to a much broader scope of resources through the MOE Regional Office and adjacent MOE Regions as needed. This will assist in achieving the goal of:

a) the continued production of potable water from water works, albeit at a reduced rate; and

b) the provision of not less than primary treatment at sewage works;

both to the extent possible under the resulting effects of the disaster.

QUICK GUIDE TO NOTIFICATION & ACTION/REPORTING



Note: to be completed at the local level.

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1.0 INTENT

1.1 Background

The Emergency Plans Act, 1983, states in Section 6(1) that it is the responsibility of each Minister of the Crown presiding over a Ministry of the Government of Ontario to formulate an emergency plan for that Ministry, governing the provision of necessary services during an emergency and the procedures under and the manner in which Crown employees and other persons will respond to the emergency.

The Ontario Ministry of the Environment (MOE) has proceeded with the preparation of a "Response Framework for Major Emergencies at Water and Sewage Works in Ontario" (to be referred to as the Response Framework in this report), pursuant to the intent of Section 6(1) of the Emergency Plans Act, 1983. This Response Framework has been developed to be used with, and indeed requires the existence of, a local emergency and contingency plan.

1.2 Purpose and Limitations

Generally the MOE objectives are that the Response Framework will show how the Policy Statements in the 1984 Emergency Planning Guidelines for water works and sewage works may be met under emergency conditions. These policy statements require the continued production of potable water from water works, albeit at a reduced rate, and the provision of not less than primary treatment at sewage works.

The Response Framework addresses eventualities of a scale and size substantially larger than the range of emergencies already covered by any emergency and contingency plan in effect at a water or sewage works or in the local municipality. These local plans will be activated initially as appropriate, before putting the MOE Response Framework into effect.

The Response Framework provides an emergency response primarily to physical factors having a sudden major impact on a water or sewage works.

The Response Framework does not consider an emergency of a nuclear origin, nor a man-made emergency due to war, sabotage or terrorist activities, strikes or riots.

1.3 Objective and Scope of the Response Framework

The Framework develops a response network, comprising a flow diagram to detail the required notification procedures, complete with the persons and the respective agencies they represent.

This Framework provides information that should be incorporated into the local emergency plan, showing available resources and support services, including other government agencies, contractors, consultants, and mutual aid organizations.

In keeping with the MOE objective, the Response Framework may come into effect when any local emergency plan appears to be inadequate and support beyond any existing local emergency plan, serving either the municipality or the water works or sewage works, is necessary.

The Response Framework will complement any local emergency plan at the water works or sewage works to suit the local requirements, depending on the specific conditions of the emergency response. The Response Framework will only then enter into force, when the requirements exceed the local resources.

1.4 Definitions

The first two definitions are quoted from the 1984 Emergency Planning Guidelines for Water Works and Sewage Works in the Province of Ontario, prepared by the MOE. They describe the so called normal emergency situations, for which the operators should be routinely prepared.

1.4.1 Emergency - in a water works

Any failure or occurrence which may cause an interruption of the supply and/or may affect the health of the consumer. These conditions can include extended power outage, failure of a major trunk water main, fire at the plant and physical aspects of contamination of the source.

1.4.2 Emergency - in a sewage works

Any failure or occurrence which may cause additional and/or abnormal discharges that could result in impairment of water quality and/or nuisance conditions. Such emergencies can include extended power outage, mechanical/structural failure of a component or components and floods.

For the purposes of the Response Framework, the following definitions apply.

1.4.3 Emergency

Any major failure or occurrence which causes a drastic interruption and reduction of the supply of potable water, or prevents a sewage works from providing the required minimum of primary treatment.

1.4.4 Disaster

Any natural event (such as hurricane, tornado, earthquake, flood or forest fire) or accidental occurrence (explosion, fire, shipwreck) which would cause the emergencies defined under 1.4.3. Refer to Appendix 1, for a summary of potential effects that such disasters may have on water and sewage works.

1.4.5 Spill

Any accidental or unauthorized discharge of chemicals into the environment, which may contaminate the water source, or into the collecting sewer, which may then interfere with the sewage treatment processes.

1.4.6 Contamination

Addition to a watershed area, reservoir, storage tank or distribution system of any material that appears in above normal concentration or that has a high nuisance or harmful effect on the consumer or the system.

2.0 POLICIES AND RESPONSIBILITIES

2.1 Policy

The Ministry of the Environment (MOE) will, through this Response Framework, undertake to arrange to provide, through the MOE District Office or the Regional Office as appropriate, such resources and supplies and remedial services as may be needed to overcome the adverse effects of a major emergency at a water works or a sewage works.

The main objective of the Response Framework is to respond to the interrupted service as soon as practicable for the well-being of the local community and for protection of the environment and downstream water users. Cost monitoring may be done, for the purposes of a reasonable cost distribution later. However, cost considerations should not be allowed to interfere with the reasonable progress of restoration of services.

2.2 Mechanism for Activating the Response Framework Procedures

Under the existing Ontario structure, a municipality has the duty and responsibility of protecting life and property of its citizens (the public). For this reason every municipality is encouraged to have its own emergency response plan (ERP).

Within the organization of a municipal ERP, the key group is the municipal control group (MCG), which authorizes and coordinates all activities from the operations centre (Ops Centre). The head of the municipal council or an alternate will chair meetings of the MCG.

If a natural disaster occurs in the community (for example, if a tornado touches down on the water works, see the summary in Appendix 1), the police and/or fire departments through their senior officials will alert the MCG to assemble and mobilize at the Ops Centre. Being prepared for

emergencies, staff at the water works will have alerted the operating agency (whether the municipality or the MOE) and also the fire and police departments. Figure 2-1 illustrates the recommended flow diagram for notification. The organigram for the response action and reporting is shown in Figure 2-2.

The MCG (through the senior engineering/public works official) will contact the MOE District office or Regional Office immediately because in this example the water works is affected. The designated MOE representative will then join the MCG at the Ops Centre and coordinate all activities at the water works. This is a departure from normal procedure, where according to the municipal ERP the MCG would call the MOE or other government agencies only when needed for advice or assistance.

It is noted that the head of council, as chairman of the MCG, has the authority to declare that an emergency exists in the municipality, and to notify the Ministry of the Solicitor General of this declaration.

A parallel notification route involves the normal procedure of the MCG calling the Ontario Provincial Police (OPP), who will call the MOE 24 hour service at the Spills Action Centre (SAC). The Centre will then contact the particular Region or the specific District. This parallel route may apply when a municipality has no ERP.

The designated MOE representative will contact the MOE Regional Director (or alternate), who will serve as central liaison for MOE resources and support services, either from within the Region or from adjacent Regions. Liaison with the MOE will continue through the several phases of emergency response, between the MOE representative at the Municipal Ops Centre and the Regional Director, until the emergency can be declared terminated.

NOTIFICATION FLOW DIAGRAM

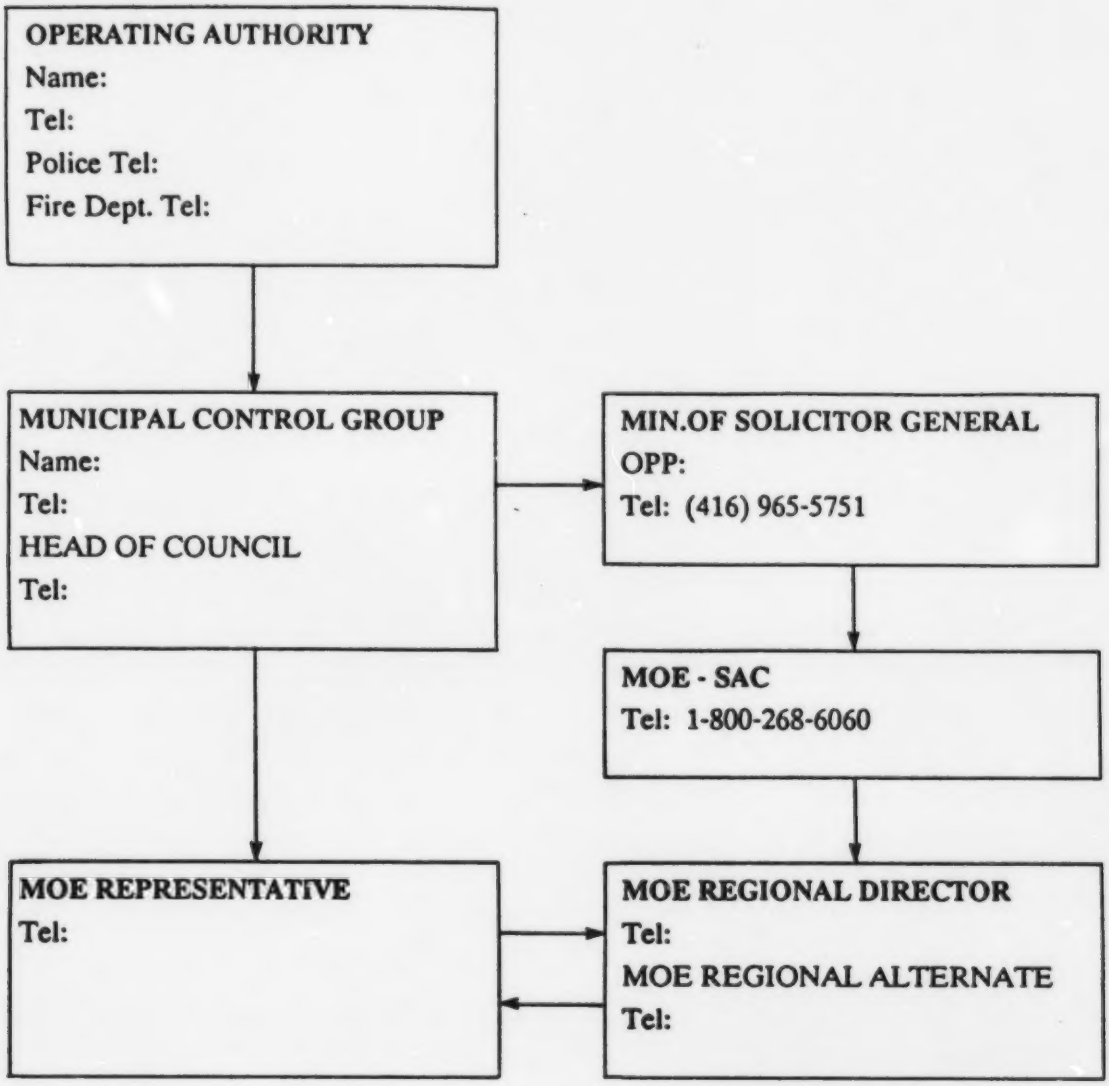

FIGURE 2-1

Note: to be completed at the local level.

ACTION/REPORTING ORGANIGRAM

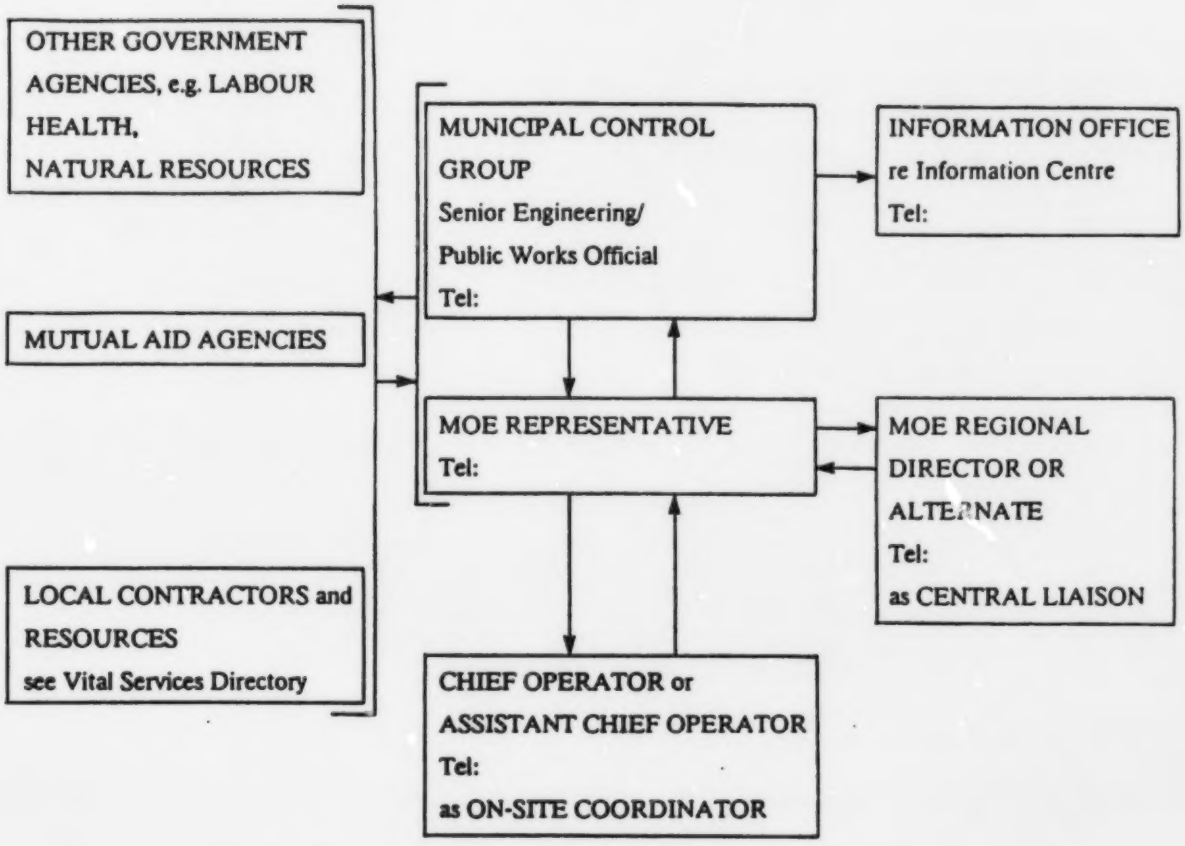

FIGURE 2-2

Note: to be completed at the local level.

The designated MOE representative will coordinate from the municipal Ops Centre the work activities necessary for restoring partial service during the period of the emergency, in cooperation with the senior engineering/public works official at the MCG, particularly if the municipality owns and operates the water works. This coordination will include contact with neighboring municipalities and utilities in keeping with mutual aid agreements.

For the purpose of restoring at least partial service (firm maximum capacity) as soon as practicable, the MOE representative will contact contractors, equipment suppliers, resources and support services, as needed. A practical resource will be the Vital Services Directory, to be developed from the outline shown in Appendix 3.

This example has referred to a disaster affecting a water works. A similar response procedure would be followed, if a sewage works were involved. In this manner the Response Framework meshes with and builds on the existing municipal ERP.

In the event that the municipality has not yet adopted an ERP, the MOE District Office's Emergency Plan must then be expanded to include also the functions and activities otherwise done by the MCG. However, close cooperation with the municipality is then a necessity. Initial notification would be from the police or fire department to the head of council, who would call the MOE District office. The District office staff would work in direct cooperation with the senior engineering/public works official, to coordinate the remedial activities.

2.3 Responsibilities of Participating Agencies

The responsibility for supplying the service, whether water supply or sewage treatment, whether at reduced capacity or at lower than design efficiency of treatment, rests with the operating authority. For a municipally

operated water works or sewage works, all services rendered by each participating agency are under the responsibility of the municipality, or the respective utility, depending on the local organization.

Where a water works or sewage works is operated by the MOE on behalf of the municipality, the MOE as operating authority carries the responsibility for continuing the service, or for restoration of the service to the municipality. Participating agencies rendering their support services during the emergency do so under the responsibility of the MOE.

The Response Framework in its present format is designed to cover a wide range of conditions. From this general approach, the Response Framework can be adapted to suit the requirements of a given Region of the Province, and even of a specific District within a Region. The main reason for this approach is the geographic diversity of the Province of Ontario and the consequent variety of potential natural disasters. In addition, for such a Response Framework to be effective,means of remedy and support action should be available from "local" sources.

3.0 RESPONSE ELEMENTS

3.1 Response Teams

As described under section 2.2 of this report, the procedures of this Response Framework take effect through the municipal ERP, complete with its municipal control group (MCG), and a support group as needed.

The MCG represents the initial level of response based on notification by police and/or fire departments. The arrival of the designated MOE representative at the Municipal Ops Centre to function as local coordinator of all activities at the water works or sewage works marks the next level of response and assures the involvement of the MOE in dealing with the effects of the emergency.

The overall objective of the municipal ERP is to save and protect lives of people and to protect property. A natural disaster such as a tornado may affect areas beyond the perimeter of a water works or sewage works. Therefore remedial work e.g. at the water works must be coordinated with other response activities to ensure that first priority items involving personal injuries and casualties receive all the needed attention.

Through the MCG with the support group, the MOE representative has access to a broad base of local resources, supplemented with a directory of vital services for the District and the Region (See Appendix 3).

It is clear that being prepared for a real emergency will require detailed preparation, including exercises of emergency conditions and training of people for all positions on the response teams. This will include all personnel designated as alternates.

3.2 Operations Centre

In accordance with the municipal ERP, an operations centre (Ops Centre) will be organized, where the MCG will assemble and from where all rescue and relief work will be arranged. It is recognized that of necessity the OpsCentre must be remotely located from the site where the disaster has occurred.

The OpsCentre must be sufficiently large that the MCG can meet, with the support group present as needed. This could involve groups of about 10 to 20 people. Space must also be available for displaying maps and aerial photographs.

Communication is vitally important, with radio likely being the most effective in the local area, due to the anticipated effects of the disaster on the telephone system. However, where possible telephone service should be provided with sufficient capacity to permit liaison with the Regional Director, and contact with other suppliers and resources, in addition to all the other telephone use by the MCG.

3.3 Role of the Designated MOE Representative

In his position within the MCG, the MOE Representative will be responsible to the Senior Engineering/Public Works official and will carry out his various duties in close cooperation with that official. This arrangement will ensure proper attention to priority requirements in the case of conflicting demands for the same service or equipment.

His duties include:

- liaison with MOE Regional Director;
- coordination of all activities at the water works or sewage works, through the chief-operator on-site;

- arrangement of aid through established mutual aid contacts;
- arrangement of supplies and services through the local "vital services" directory;
- updating the MCG through the Senior Engineering/Public Works official on the progress of the work.

3.4 Role of the Plant Operator

The chief operator of the damaged plant will maintain all necessary liaison to the MOE Representative in the Ops Centre. As alternate the assistant chief operator is proposed.

The function of the plant operator is to assess the damage to the extent possible, without endangering himself, to call for help for any injured plant staff, and to determine an action plan to restore partial service to the municipality, whether at a water works or a sewage works. Direct communication with the MOE will permit contacting the specific sources of expertise, resources and equipment required for the action plan. This may include road clearing operations to provide access to the plant site and to the plant buildings.

3.5 MOE District Emergency Plan

It will be necessary for each District office of the MOE to develop from the Response Framework an emergency plan to suit the local circumstances. The MOE District Emergency Plan then becomes a useful document for the local municipality, as a companion to the municipal ERP, to be activated in case of major damage to the water works or sewage works.

In the process of developing the MOE District Emergency Plan for the local circumstances, the Regional Director or his alternate should conduct an updated assessment of vulnerability at each water works and sewage

works, as outlined in the 1984 Emergency Planning Guidelines. It is understood that the respective collection and distribution systems are included in "works".

A regular assessment of vulnerability should be conducted, preferably annually, providing an updated state of preparedness of the "works" to face potential emergencies. The Regional Director or his alternate should ensure that any weaknesses uncovered by a vulnerability assessment are resolved as soon as it is practical.

Through regular contacts with the municipalities the Regional Director (or his alternate) is in a position to recommend that a municipality prepare and adopt a municipal ERP if it has not done so yet. This would simplify developing the MOE District Emergency Plan for those local circumstances.

In a similar way the Regional Director (or his alternate) will know which water or sewage works still need to prepare an emergency plan. Through the vulnerability assessment at each plant, the officer will be able to encourage the local operating authority to start preparing its own emergency plan.

In adapting the MOE District Emergency Plan to meet the local requirements, the Regional Director (or his alternate) will cooperate with the municipality in making mutual aid agreements with neighbouring municipalities and utilities, suited to the local circumstances.

4.0 INFORMING THE PUBLIC

4.1 Introduction

In keeping with the municipal responsibility of protecting life and property of the citizens (the public), a vital activity is keeping the public informed during an emergency. When their health and well-being are concerned, through water supply and sewage treatment, accurate information is essential.

4.2 Information Services

As recommended in the "Guide to Emergency Planning and Operations by Municipalities", an information centre (InfoCentre) should be located in close proximity to but separate from the OpsCentre.

An information officer will receive information from the MCG for dissemination to the news media. The officer will also arrange for the Head of Council to keep the public periodically up to date. The InfoCentre can also be used by members of the public to receive information.

Under most emergency circumstances, the MCG would function from the OpsCentre, with an InfoCentre near to it. It is a municipal responsibility to keep the public informed. Any announcement from the MOE would be channeled via the MCG to the InfoCentre. The primary concern is that all announcements are accurate, substantiating each other, and that they remain authoritative and credible.

5.0 RESPONSE PROCEDURES

5.1 Response Sequence

The sequence of responses described in this chapter comprises the four phases of an emergency response framework.

- discovery and alarm;
- evaluation and activation of procedures of the Response Framework;
- counter measures and control;
- clean-up and disposal.

It is recognized that the details of each of the phases of response may vary with the type of disaster that could occur. However any overall response will comprise these four stages. The smoothness and effectiveness of the response program will be a direct function of the status of preparedness for such an occurrence.

5.2 Discovery and Alarm

For a natural disaster, such as a tornado, the discovery is rather easy; its presence in a given area will be noticed by many people. However, it occurs almost without warning, and moves in an unpredictable manner along its path of destruction.

Under such circumstances a general alarm will have been given, either by the police or fire departments, possibly before the tornado has struck the water works for example, or the elevated storage tank. At that time the chief operator (presumed to be safe) will raise the alarm, by calling the operating authority (the municipal utility, or public works).

In the event of a water intake being blocked or a supply trunk main having failed, instrumentation at the water works will signal the immediate drop of pressure and the much reduced (or zero) flow of raw water into the plant. This condition will alarm the chief operator (or the operating authority), who in turn must notify the municipality.

5.3 Evaluation and Activation of the Response Framework Procedures

The chief operator, or the assistant chief operator, will be best able to assess the damage and to judge the impact on the plant's capability to continue serving the municipality.

A tornado striking a water works may cause such severe damage and interruption of service, that the municipal ERP comes into effect, assembling the MCG, with the designated MOE Representative being called immediately to join the MCG. This step activates the procedures of the Response Framework, which remain in effect until the head of municipal council declares the emergency terminated.

When a supply trunk water main has failed, the result may be a drastic reduction of water flow to the community. Under these circumstances, an emergency response may involve the municipal utility recommending that the head of council issue an order for a major reduction of all water consumption and an immediate cessation of all non-essential water usage. If the anticipated repair of the trunk main is likely to require more than 24 hours, and the remaining water in the reservoirs is judged insufficient, an alternate source of supply may be needed. In that case the designated MOE Representative should be called, thus activating the procedures of the Response Framework.

5.4 Countermeasures and Control

In general the action should be appropriate to the given circumstances. It is clear that the specific countermeasures will vary with each different emergency.

To adapt the MOE District Emergency Plan (once developed from the Response Framework) to the water and sewage works of a given municipality, the MOE Representative must review with the respective chief operators the types of disasters that are realistically to be expected in view of the types of facilities located in the District. Then appropriate response operations (countermeasures) can be planned for each anticipated emergency.

Thorough familiarity with the planned countermeasures will permit knowledgeable flexibility of real response operations to an actual emergency. This may be of particular importance when the real conditions differ from those considered in the MOE District Emergency Plan.

5.5 Cleanup and Disposal

The Response Framework is concerned with the effect of disasters on water works and sewage works in the Province of Ontario. In the context of a response to the resulting emergencies, cleanup may include some restoration to pre-disaster conditions. However, any necessary major reconstruction will be dealt with on a case by case basis.

For the purposes of the MOE District Emergency Plan then, cleanup will mean removal of all accumulated debris from the site, while the plant is operating normally, e.g. at firm maximum capacity. This debris includes all materials and equipment damaged beyond repair by the disaster. It is assumed that temporary facilities will be set up in place of any buildings that were damaged or destroyed.

6.0 REVIEW AND UPDATE

Emergency planning must be an ongoing activity, to maintain an adequate level of preparedness. Therefore as a follow-up to an actual emergency, or to a mock disaster as a practice emergency, the Response Framework should be reviewed and the MOE District Emergency Plan should be updated or expanded, based on the experience gained through the emergency response operations carried out.

Even with the best made and well exercised plans, it will be necessary to remain flexible under real response operations, and to adjust the planned response to the local requirements and immediate needs as they occur.

Then a detailed review of the experience, along with the results of the annual vulnerability assessments, will provide needed input for revising the MOE District Emergency Plan.

Such a review should be made by key people having participated in the response operations. These would include the designated MOE Representative, the chief operator and the assistant chief operator, and the senior engineering/public works official, among others. Clearly the MCG should be represented in this review, as the response operations have been conducted in cooperation with the municipality through coordination from the MCG.

Provisions should be made for an annual or bi-annual review of the accuracy of the Vital Services Directory (Appendix 3). This directory is a key section of the MOE District Emergency Plan, as it contains the resources and services locally available or within reach.

Once the emergency has been declared terminated, the rebuilding phase can begin. Under these conditions, plant operations will require special attention, to ensure that the water quality is not compromised (in case of a water works).

Ultimately the plant will be producing at full capacity again, once all necessary reconstruction has been completed. The normal operation can resume, and any water use restrictions still in effect can then be lifted.

A similar rebuilding project might be necessary at a sewage works depending on the extent of the damage. Careful attention must be given to the interim operation of the plant, to achieve the best degree of overall treatment possible, and thus to minimize any adverse effects on the receiving water. When all reconstruction has finished, plant operation can return to full capacity at the design treatment efficiency.

Reconstruction should endeavor to include features which would allow the works better to withstand a similar disaster in the future.

APPENDIX 1

POTENTIAL EFFECTS OF DISASTERS

APPENDIX 1

POTENTIAL EFFECTS OF DISASTERS

POTENTIAL EFFECTS / TYPES OF DISASTERS	Tornado at Water Works	Tornado at Sewage Works	Elevated Storage Tank out of service	Collapse of Major or of Only Trunk Watermain	Shipwreck at Water Intake	Explosion/Fire at Water Works	Explosion/Fire at Sewage Works	Forest Fire at Water Works	Forest Fire at Sewage Works	Flood at Water Works	Flood at Sewage Works
PLANT PHYSICAL DAMAGE	X	X	X			X	X	X	X	X	X
RESTRICTED SUPPLY OF WATER				X	X						
REDUCED WATER FLOW	X			X	X	X		X		X	
WATER STORAGE TANK DAMAGE	X		X			X		X		X	
BROKEN WATER MAINS			X	X							
CONTAMINATION	X		X	X	X	X		X		X	
SEWER SYSTEM DAMAGE		X					X		X		X
SEWAGE PUMPING STATIONS OUT OF SERVICE		X					X		X		X
POLLUTION - EMERGENCY OVERFLOWS - NO/PARTIAL TREATMENT		X X					X X		X X		X X
POWER OUTAGES	X	X	X			X	X	X	X	X	X
COMMUNICATION DISRUPTION	X	X	X			X	X	X	X	X	X
TRANSPORTATION FAILURE	X	X	X			X	X	X	X	X	X
EMPLOYEE SHORTAGES	X	X				X	X	X	X	X	X

Reference : AWWA M19 Table 2-5

APPENDIX 2

DIRECTORY OF MOE REGIONAL AND DISTRICT OFFICES

APPENDIX 2

Directory of MOE Regional and District Offices

Central Region		
Toronto Regional Office		(416) 424-3000
District Offices:	Barrie	(705) 726-1730
	Halton Peel	(416) 844-5747
	Muskoka	(705) 687-3408
	Peterborough	(705) 743-2972
	Toronto East	(416) 467-3013
	Toronto West	(416) 467-3007
	York Durham	(416) 467-3009
Northeastern Region		
Sudbury Regional Office		(705) 675-4501
District Offices:	North Bay	(705) 476-1001
	Sault Ste. Marie	(705) 949-4640
	Sudbury	(705) 675-4501
	Timmins	(705) 268-3222
	Parry Sound Sub-Office	(705) 746-2139
Northwestern Region		
Thunder Bay Regional Office		(807) 475-1205
District Offices:	Kenora	(807) 468-5578
	Thunder Bay	(807) 475-1315

Date: _____

Southeastern Region

Kingston Regional Office		(613) 549-4000
District Offices:	Cornwall	(613) 933-7402
	Kingston	(613) 549-4000
	Ottawa	(613) 521-3450
	Belleville Sub-Office	(613) 962-9208
	Pembroke Sub-Office	(613) 732-3643

Southwestern Region

London Regional Office		(519) 661-2200
District Offices:	Owen Sound	(519) 371-2901
	Sarnia	(519) 336-4030
	Windsor	(519) 254-2546

West Central Region

Hamilton Regional Office		(416) 521-7640
District Offices:	Cambridge	(519) 653-1511
	Hamilton	(416) 521-7732
	Welland	(416) 384-9896

MOE Spills Action Centre — 1-800-268-6060
Toronto, 24-hour service

Date: _____

APPENDIX 3

REPRESENTATIVE VITAL SERVICES DIRECTORY

APPENDIX 3

Representative
Vital Services Directory

List of Categories to be included: alphabetical by category
or name of utility or company.
(To be finalized for each MOE District Emergency Plan, or for each locally adapted District Emergency Plan).

- Boats, Rental & Charter
- Bulldozers (see Contractors Equipment & Supplies)
- Chemicals suppliers
- Canadian Coast Guard
- Computer Service Repair & Maintenance
- Concrete Contractors Commercial & Industrial
- Contractors Equipment & Supplies (Rental)
- Divers
- Electric Contractors
- Environment Canada, Weather Service (Blue Pages)
- Excavating Contractors Commercial & Industrial

- Fire Departments (local no.)
- Gasoline (see oils - petroleum/fuel)
- Generator Electric Commercial
- Graders (see Contractors Equipment & Supplies)
- Helicopter Service
- Ontario Hydro, Local Hydro Electric Commission
- Lighting Equipment, Emergency
- Marine Contractors
- Masonry & Bricklaying Contractors
- Mechanical Contractors
- Ministry of Natural Resources (pumps)
- Oils, fuel
- Oils, petroleum
- Pumps - mobile (renting)
- Pumps - industrial (repairing)
- Radio communication, equipment & system

- Radio Club/ham operator
- Telephone company
- Towing automotive
- Towing marine
- Transcanada pipelines
- Tunnelling Contractors
- Utilities - hydro electric
  - gas
  - water
  - public works
- Welding - Commercial & Industrial